

Water Quality Studies in the Salton Sea

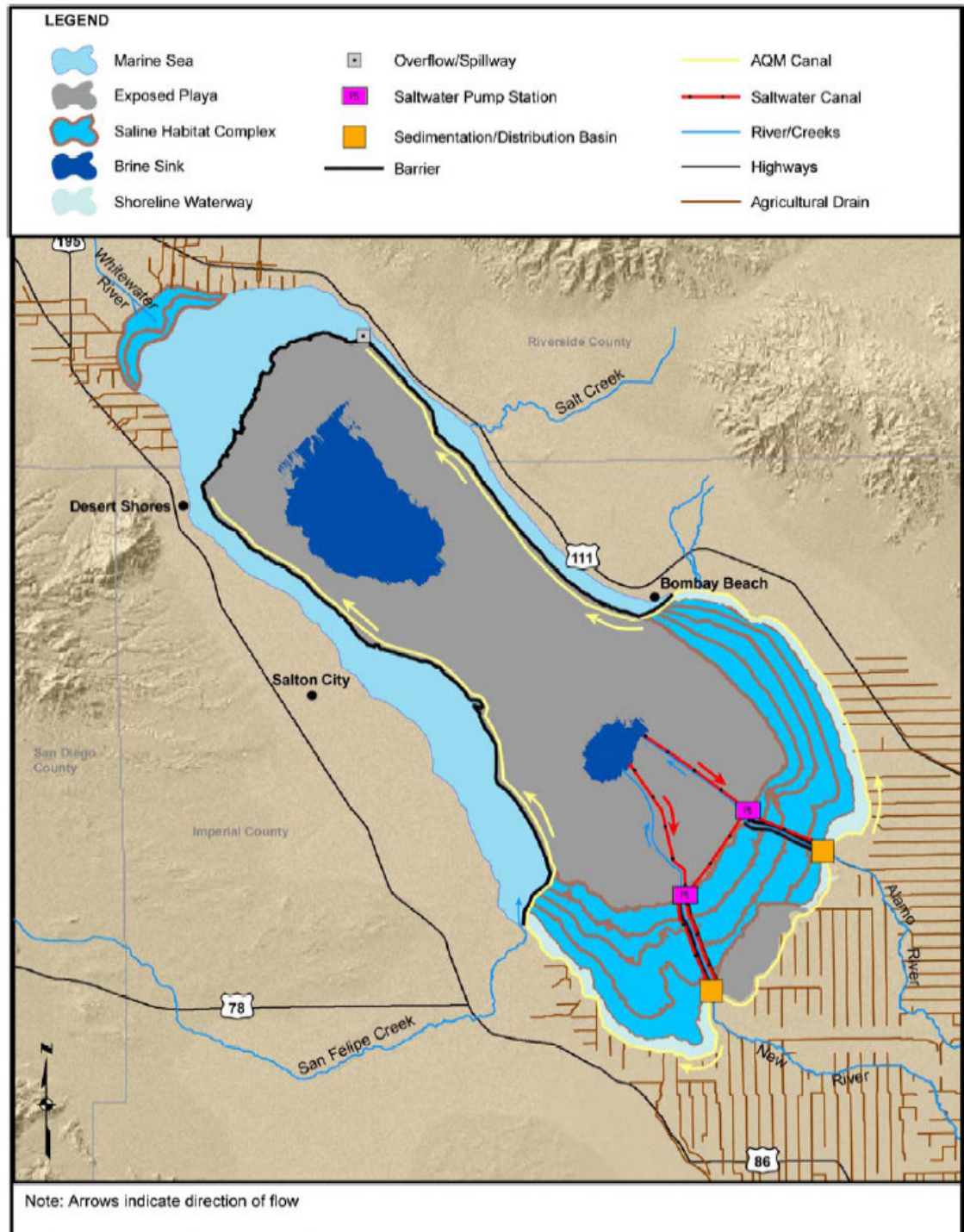
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Tetra Tech, Inc.

Presentation to

**HYDROLOGIC FOCUSED
TECHNICAL GROUP
UC Riverside Campus**

March 26, 2008

State of California's Preferred Alternative (2007)



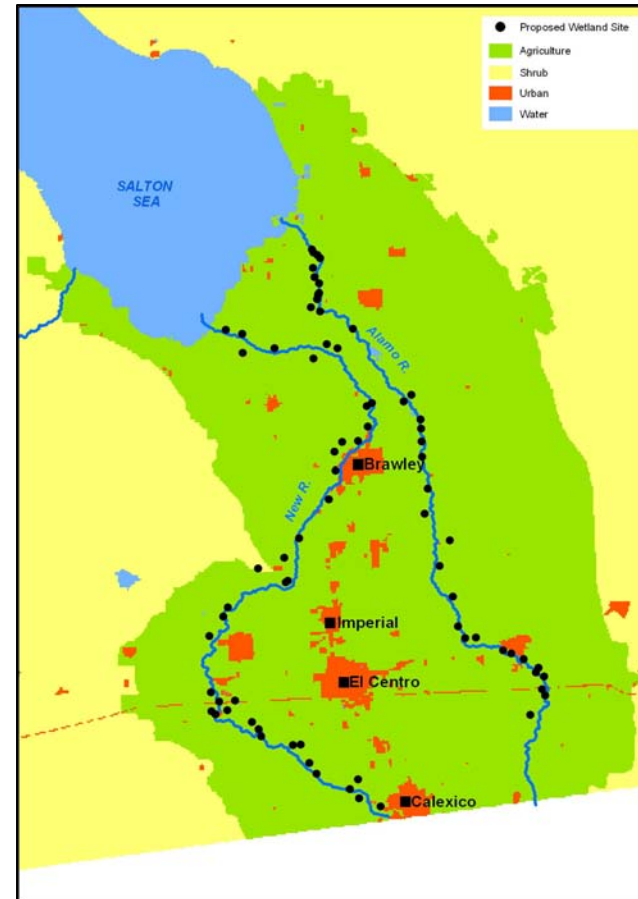
Salton Sea Authority Preferred Alternative (2006)



Related Projects

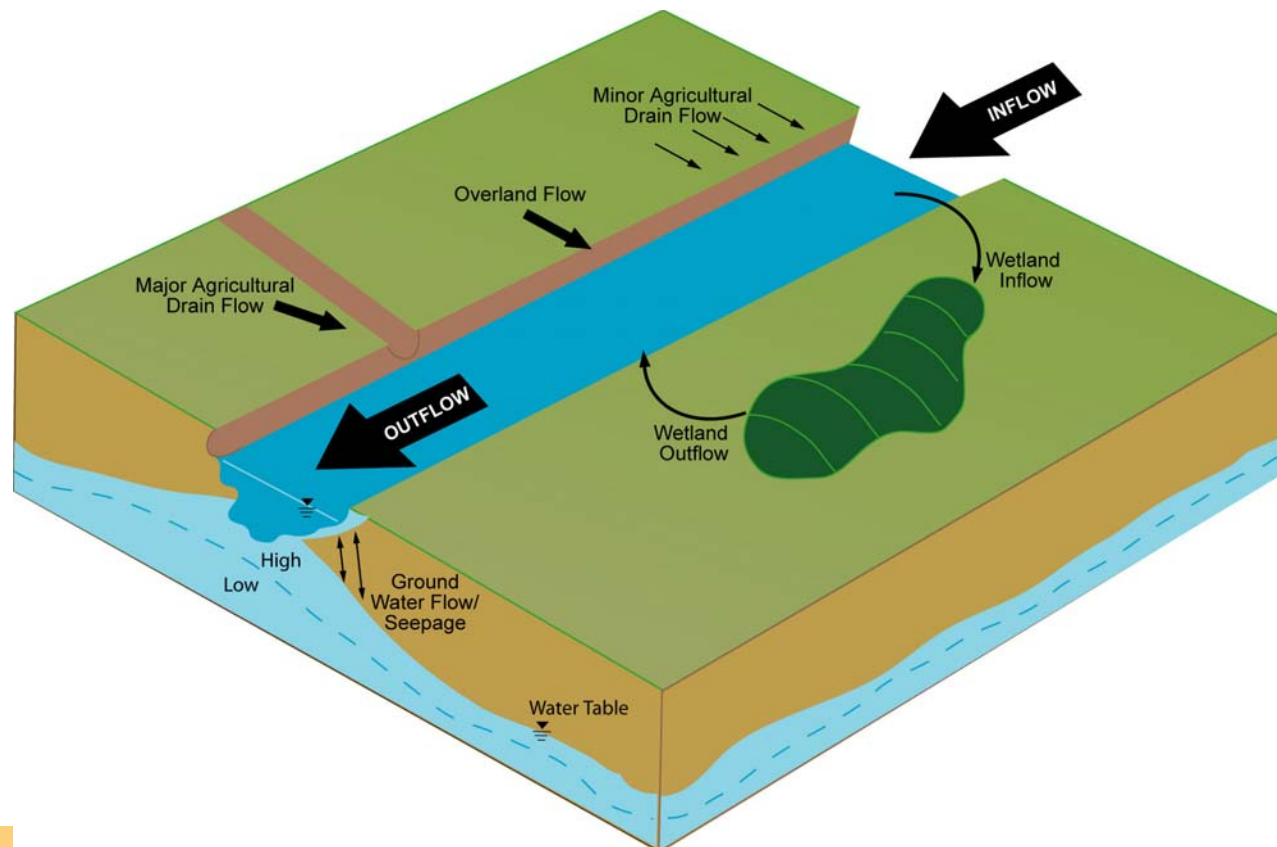
- **Environmental support for restoration plans**
- **New River wetlands performance evaluation**
- **Watershed modeling and wetlands master plan**
- **Pilot testing of ozonation**
- **Modeling of in-sea water quality**

Wetland Network Model Developed for New and Alamo River Basins



Water Quality Modeling

We developed a stream/wetland model to simulate benefits of a network of wetlands on water quality in the New and Alamo River Basins

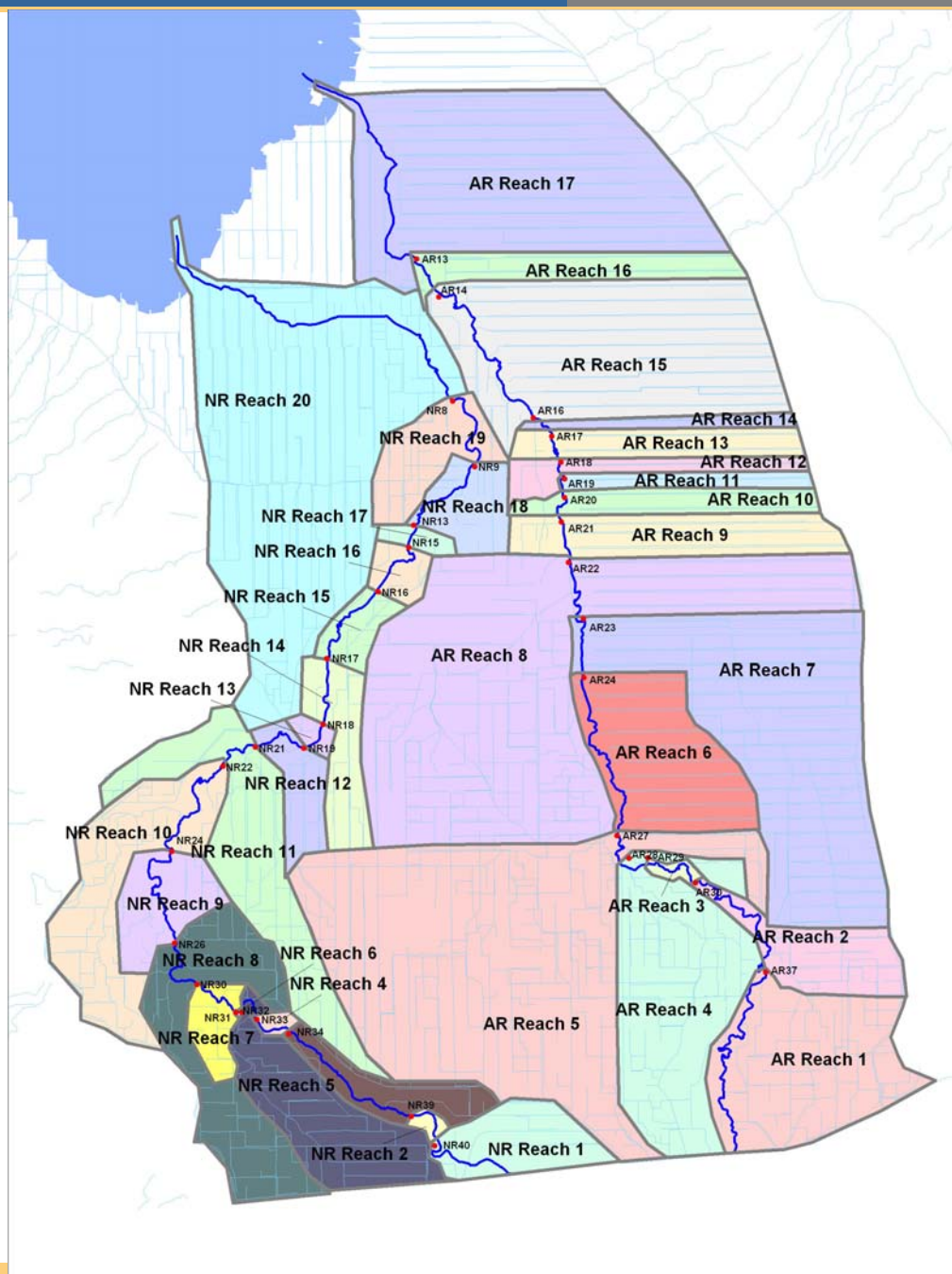


Model Calibration

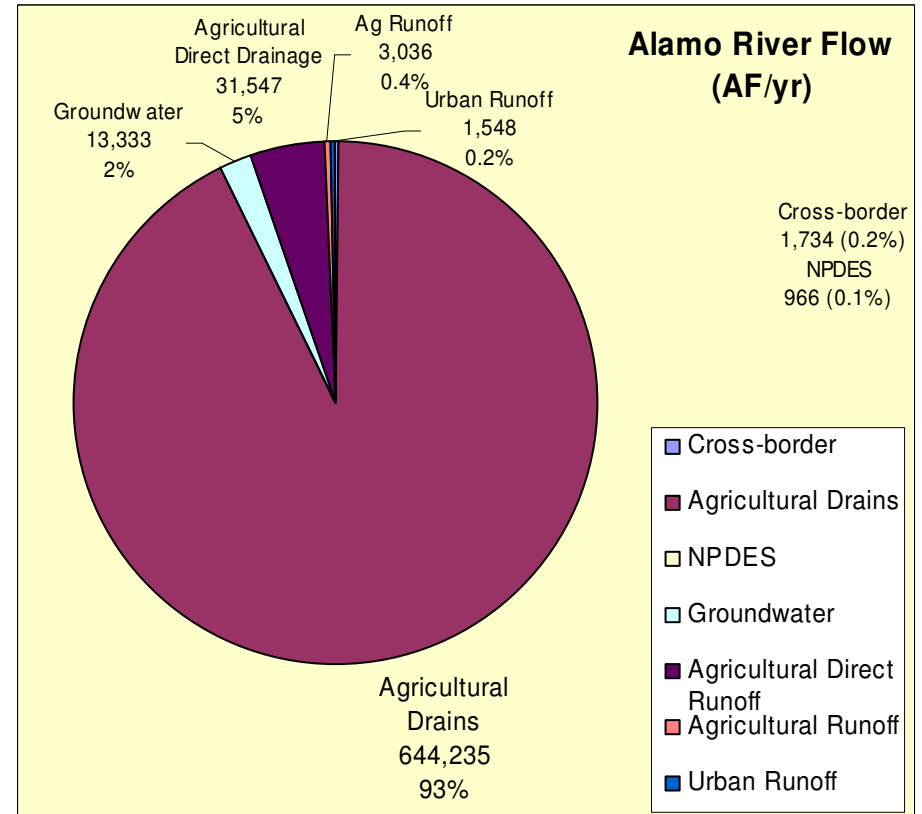
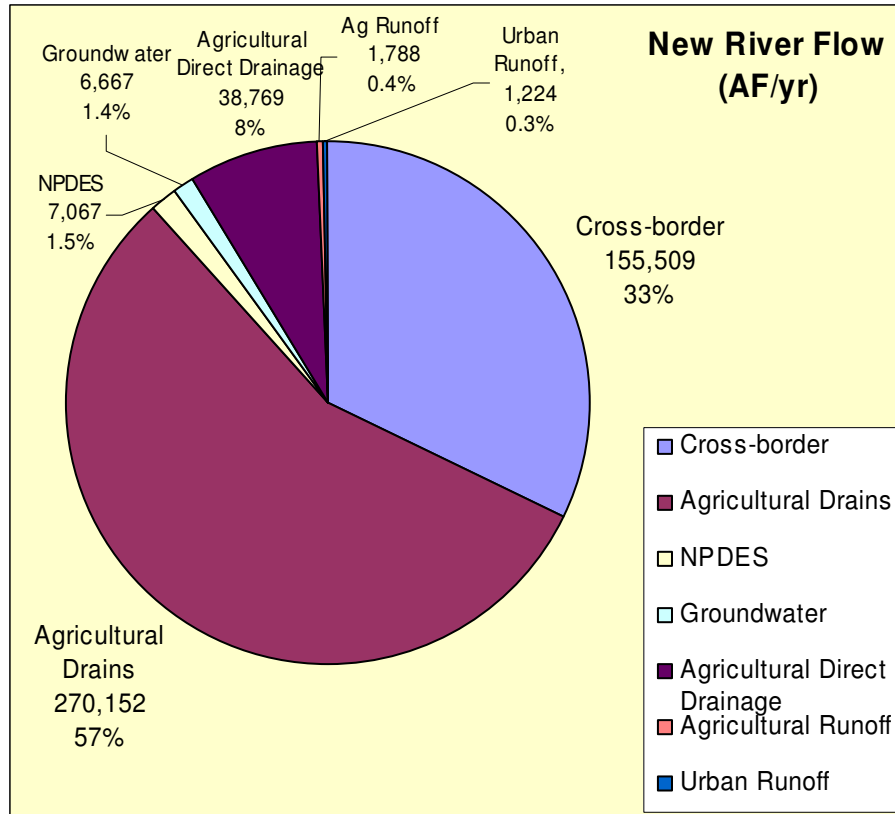
- **Model calibrated to data on**
 - **Flow**
 - **Nitrogen**
 - **Phosphorus**
 - **Suspended sediments**
 - **Coliforms**
 - **Selenium**

WQ Model Reaches

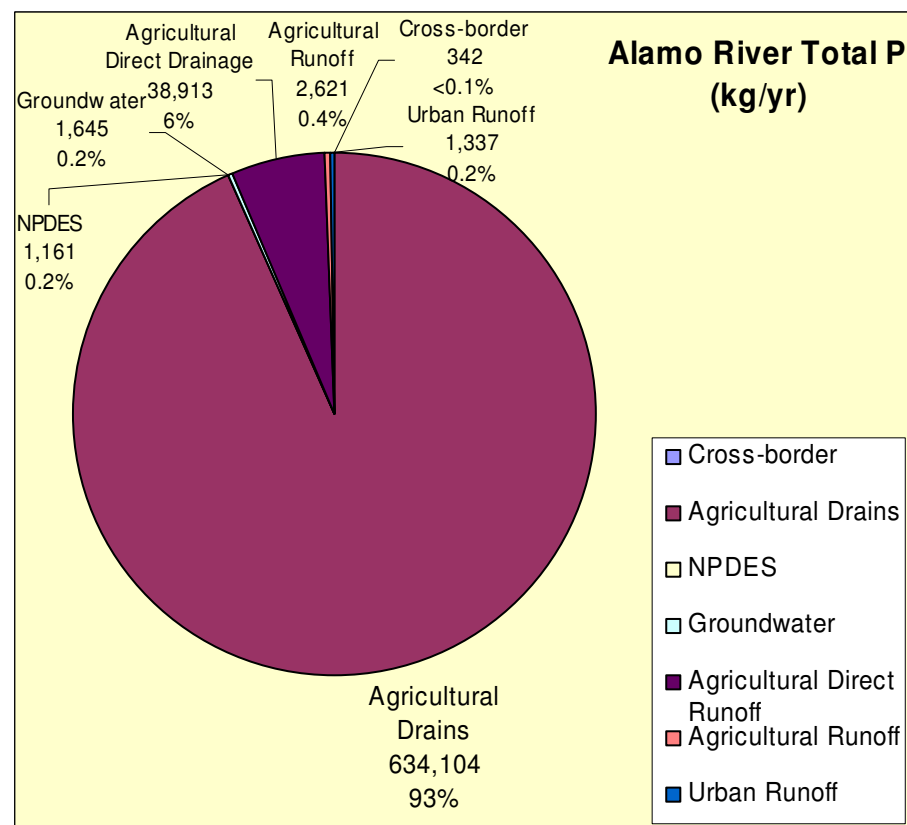
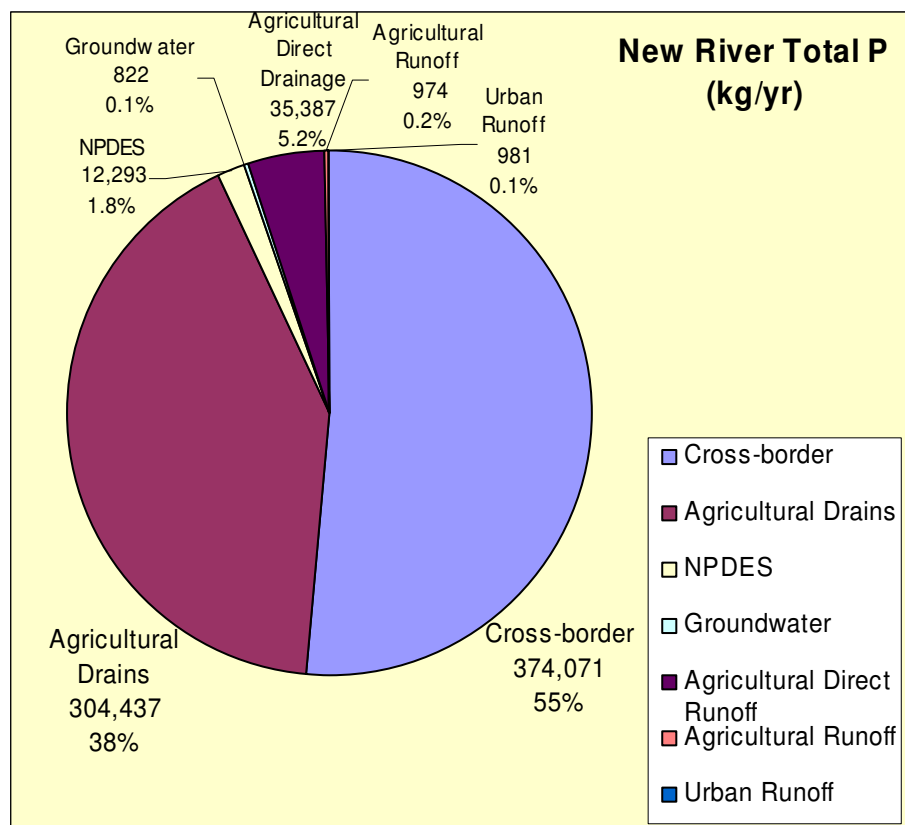
- 35 proposed wetland sites -19 on New River (2,800 acres) and 16 (1,500 acres) on Alamo River
- 37 proposed reaches -20 on New River and 17 on Alamo River (drainage areas given by gray lines)



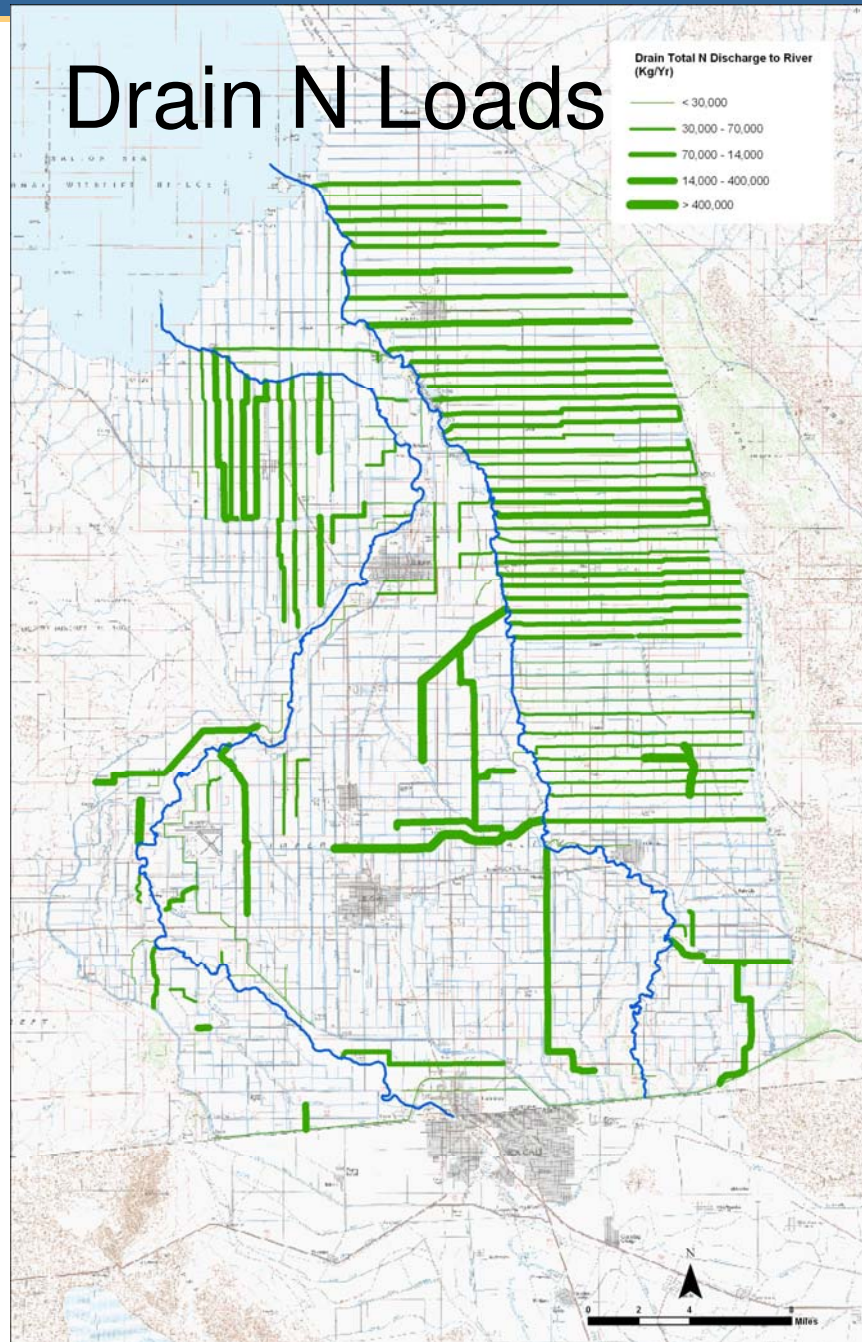
Flow Sources



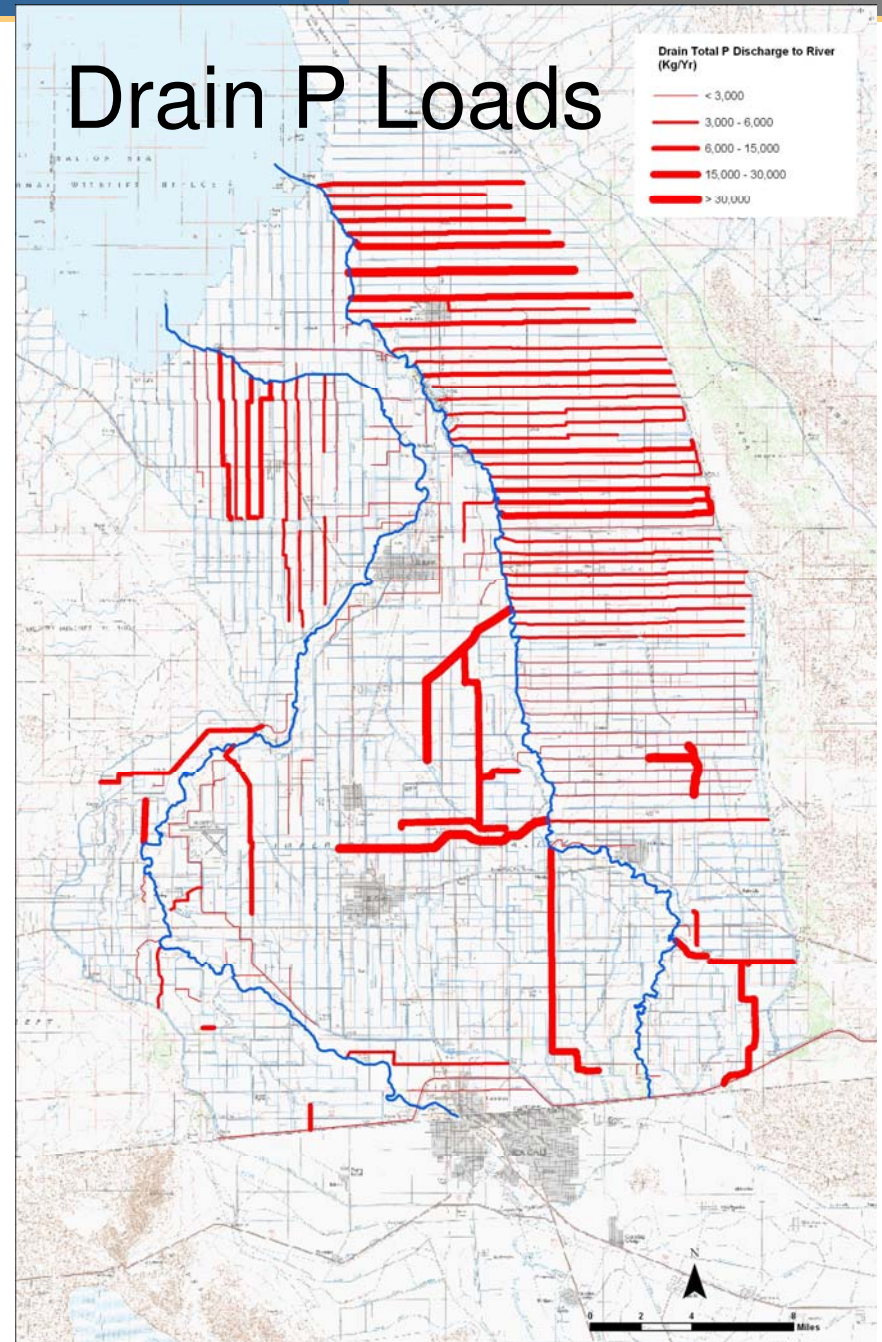
Key Nutrient Sources



Drain N Loads



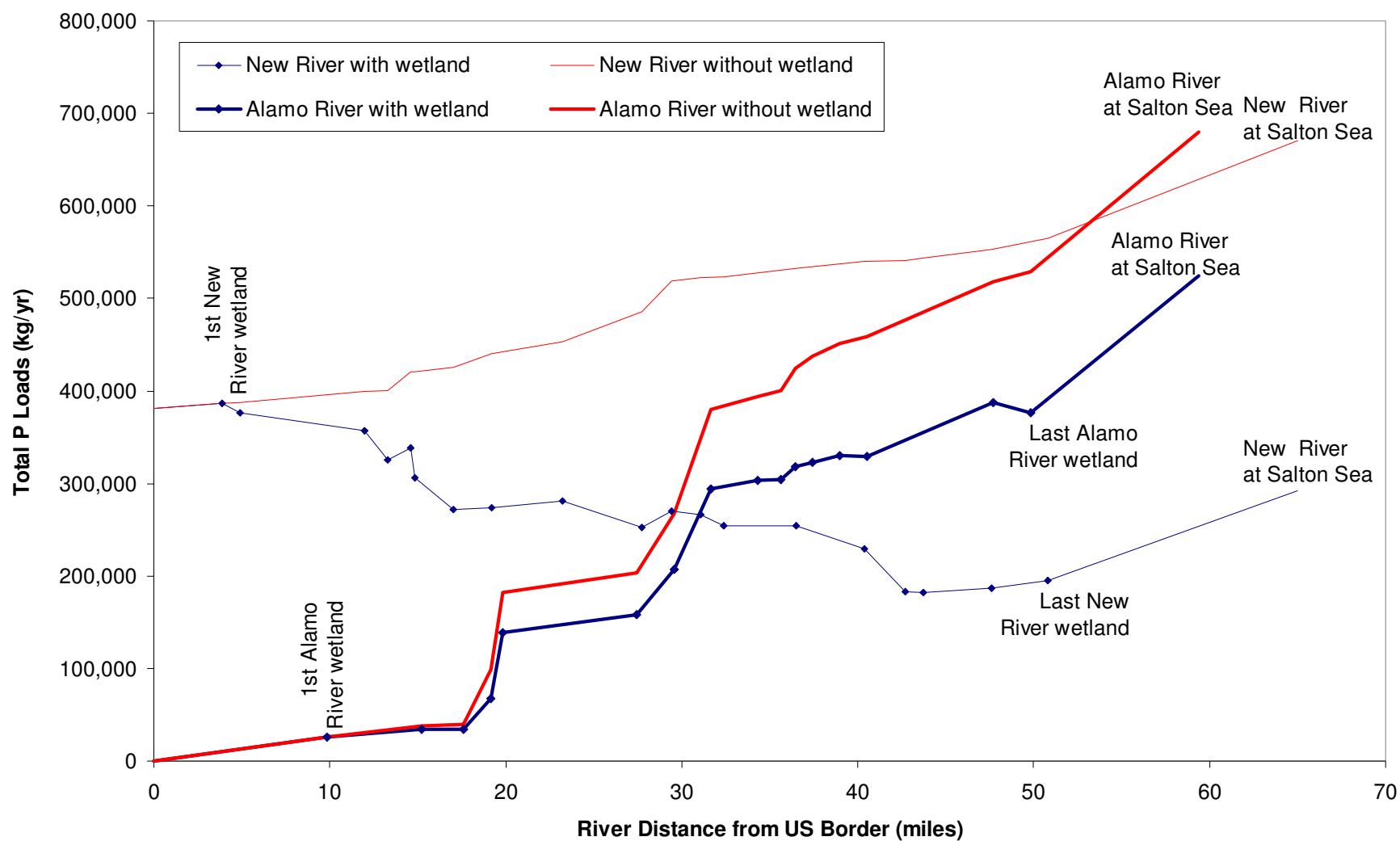
Drain P Loads



Load Sources Within the Alamo and New River Watersheds

- **6 to 8 drains per river provide 50% of total drain flow and load**
- **Alamo River has especially high loads in 2 areas: 20 miles north of the border (Central and South Central Mains) and 30 miles north of the border (Rose and Holtville Mains)**
- **Both rivers have high flows and loads in the far north of their watersheds, beyond the area with recommended wetlands per the Nolte Report (for the New River, almost 50% of drain loads are in last 10-15 miles)**

Total P Loads in New and Alamo Rivers with and without Wetlands



Pilot Test of Ozonation

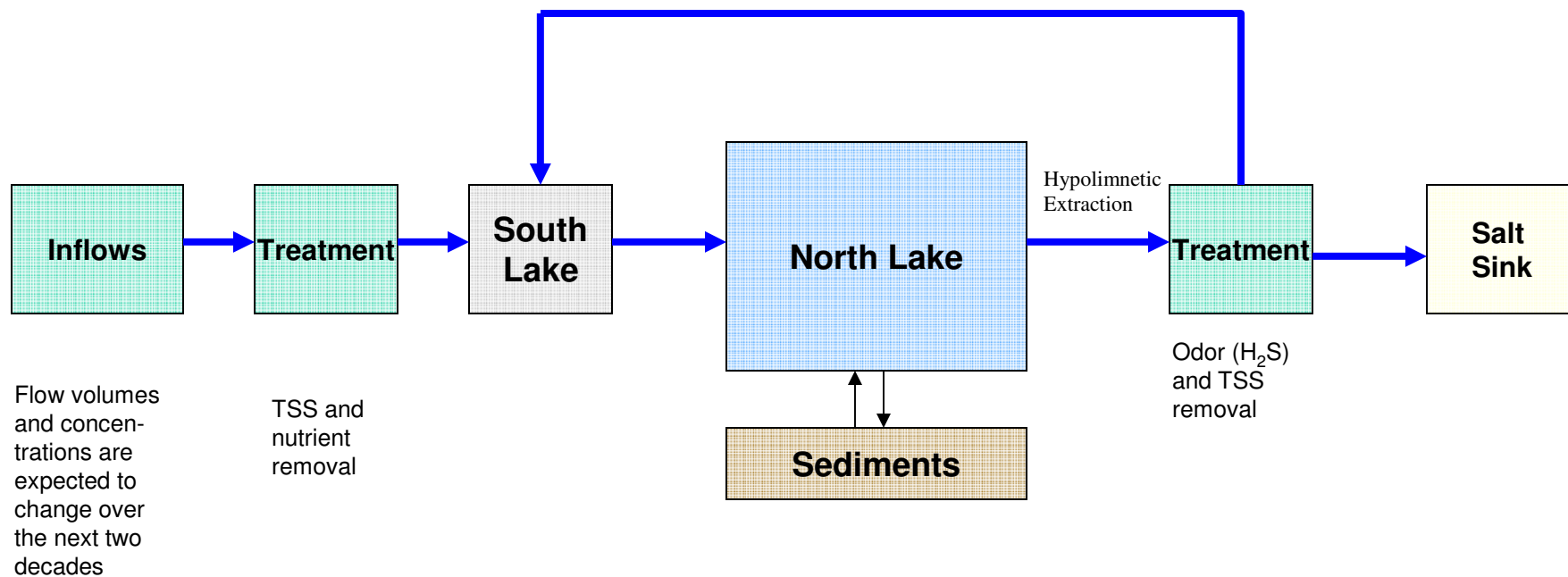


Pilot Test Results

Summary of Ozone Requirements and Initial Sulfide Concentrations

Date	Initial Sulfide Concentration in mg/L	Ozone Requirement in mg/L	Sulfide/Ozone Requirement per mg of Sulfide
10/23/2006	0	0	0
10/24/2006	27	85.1	3.15
10/25/2006	17	59.7	3.51
10/26/2006	23.09	67.5	2.92
10/27/2006	29	87.8	3.03
10/30/2006	9.5	32.8	3.45
10/31/2006	20.77	69.4	3.34
11/1/2006	11	22.9	2.08
11/2/2006	4.12	31.6	7.67
11/3/2006	11	33.6	3.05
11/6/2006	12	49.5	4.13
11/7/2006	16.66	56.3	3.38
11/8/2006	13	37.5	2.88
11/9/2006	7.4	47.0	6.35
11/14/2006	12.4	62.9	5.07
11/15/2006	5.9	68.9	11.68

Water Quality Model Schematic



Goal is to represent the overall performance and sensitivity of the planned restored system

Features/Constituents to be Modeled

- **Hydrodynamics**
- **Salinity**
- **Nutrients, especially phosphorus and ammonia**
- **Sulfate/sulfide**
- **Dissolved oxygen**
- **Chlorophyll a**